(12) UK Patent Application (19) GB (11) 2 224 191 (13) A

(43) Date of A publication 02.05.1990

(21) Application No 8921940.6

(22) Date of filing 28.09.1989

(30) Priority data
(31) 63244785 (32) 29.09.1988 (33) JP
01215348 22.08.1989

(51) INT CL⁴
A01G 9/00

(52) UK CL (Edition J)
A1E EAKX EK19 EK21 EK29

(56) Documents cited
WO 85/03842 A1

(58) Field of search
UK CL (Edition J) A1E EAAA EAAB EAKX
INT CL⁴ A01C, A01G

(71) Applicant
Morimura Kosan Kabushiki Kaisha

(Incorporated in Japan)

4-25, Segawa 5-chome, Mino-shi, Osaka-fu, Japan

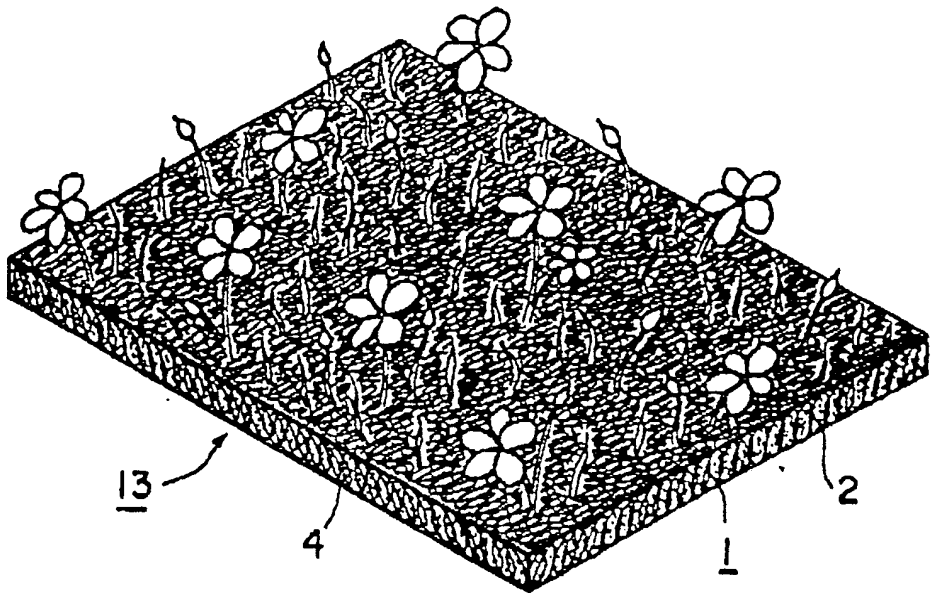
(72) Inventor
Tadaki Morimura

(74) Agent and/or Address for Service
D Young & Co
10 Staple Inn, London, WC1V 7RD, United Kingdom

(54) Apparatus for culturing plants

(57) Apparatus for culturing plants, comprises a three-dimensional generally planar network element (1) constructed of synthetic resin filaments (2) which extend in curves and zigzags and are entangled and partially welded to each other, the three-dimensional flat network element (1) having at least one cavity portion therein filled with culture soil (4). The flat network element (1) can be hung on a wall in a substantially vertical orientation.

FIG. 1



GB 2 224 191 A

FIG. 1

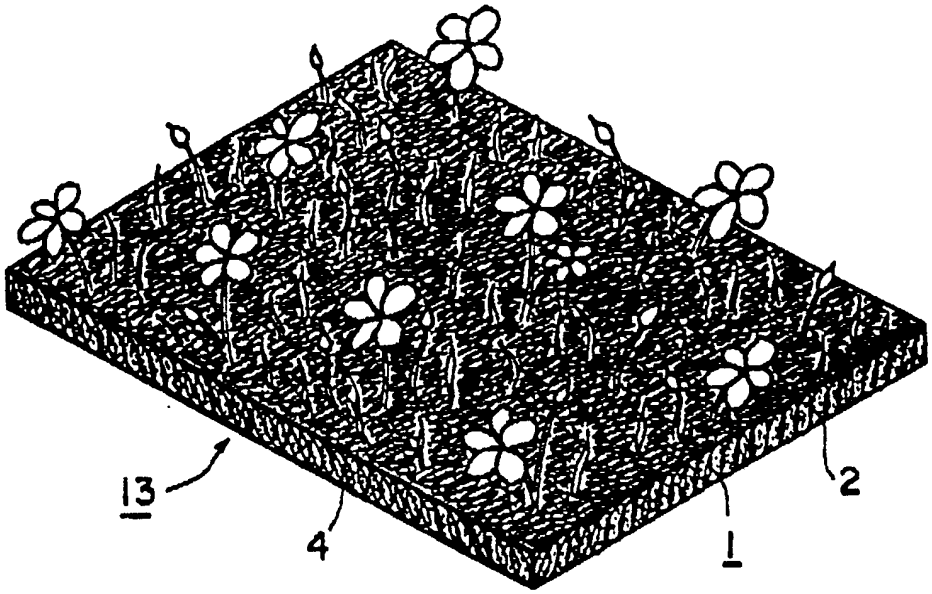


FIG. 2

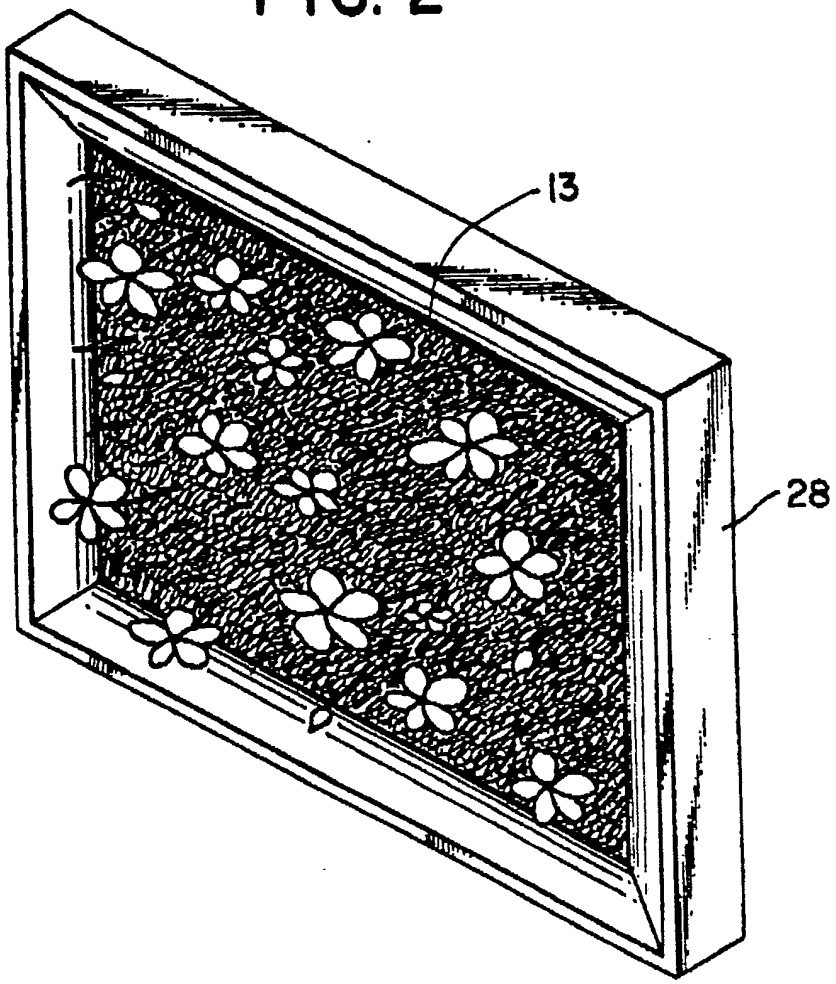


FIG. 3

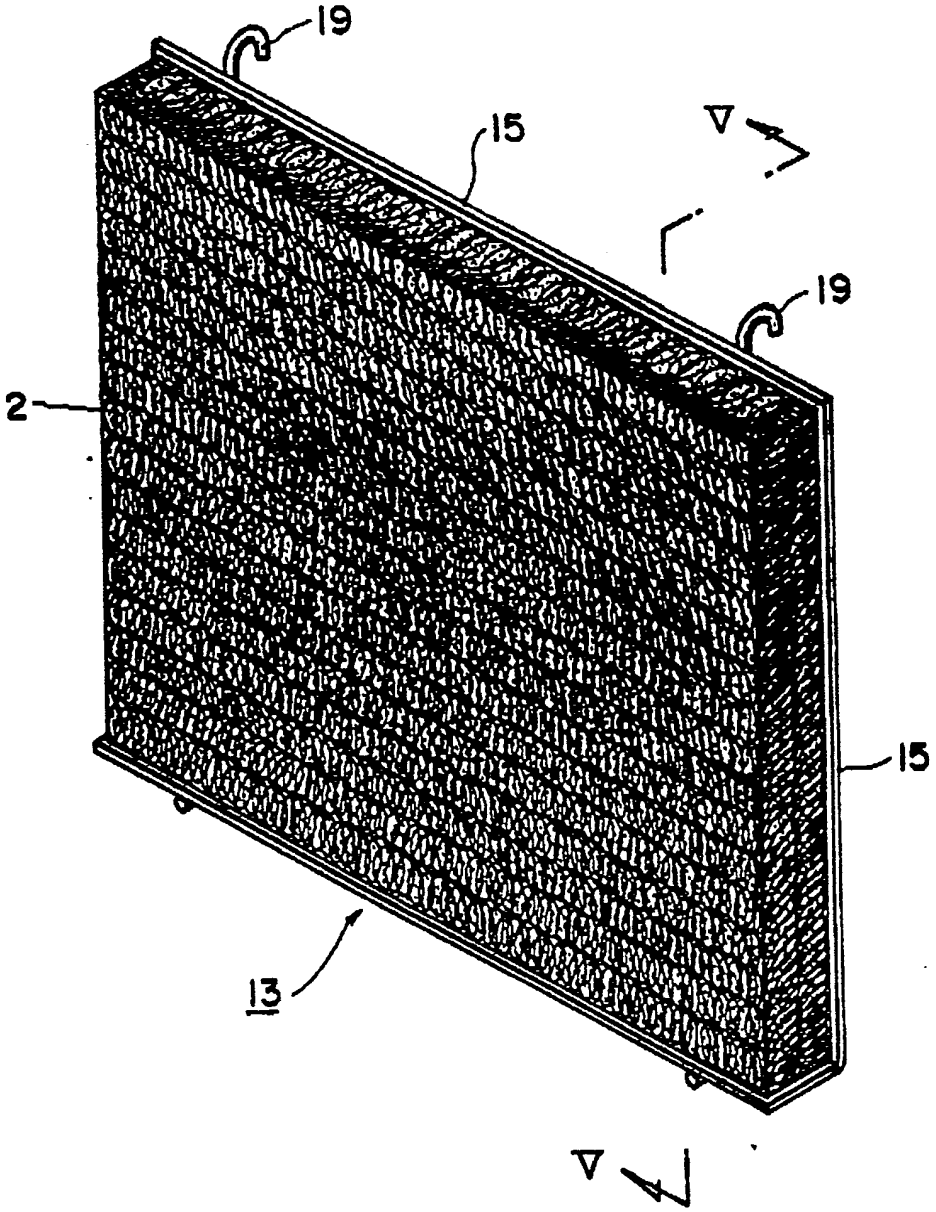


FIG. 4

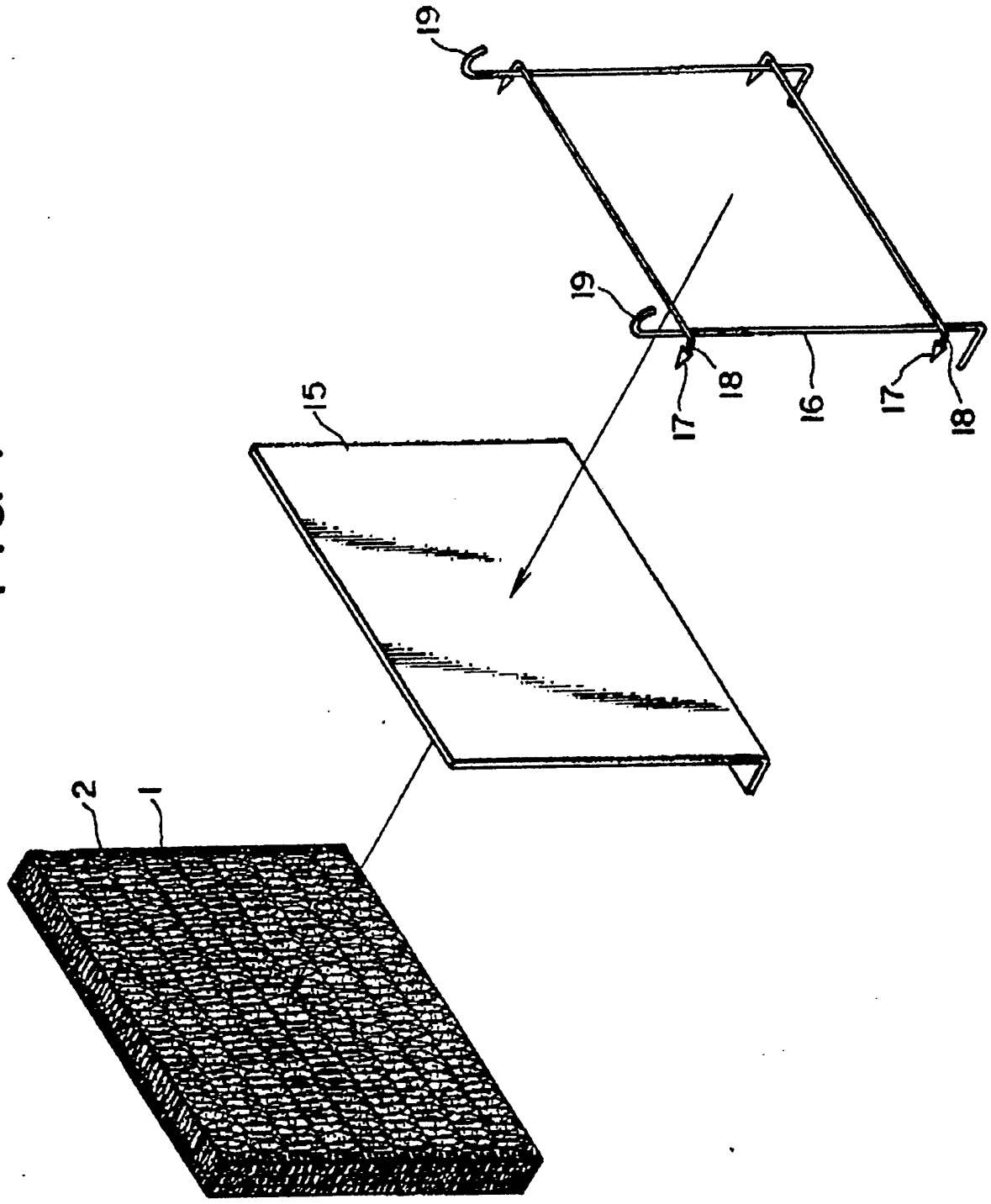


FIG. 5

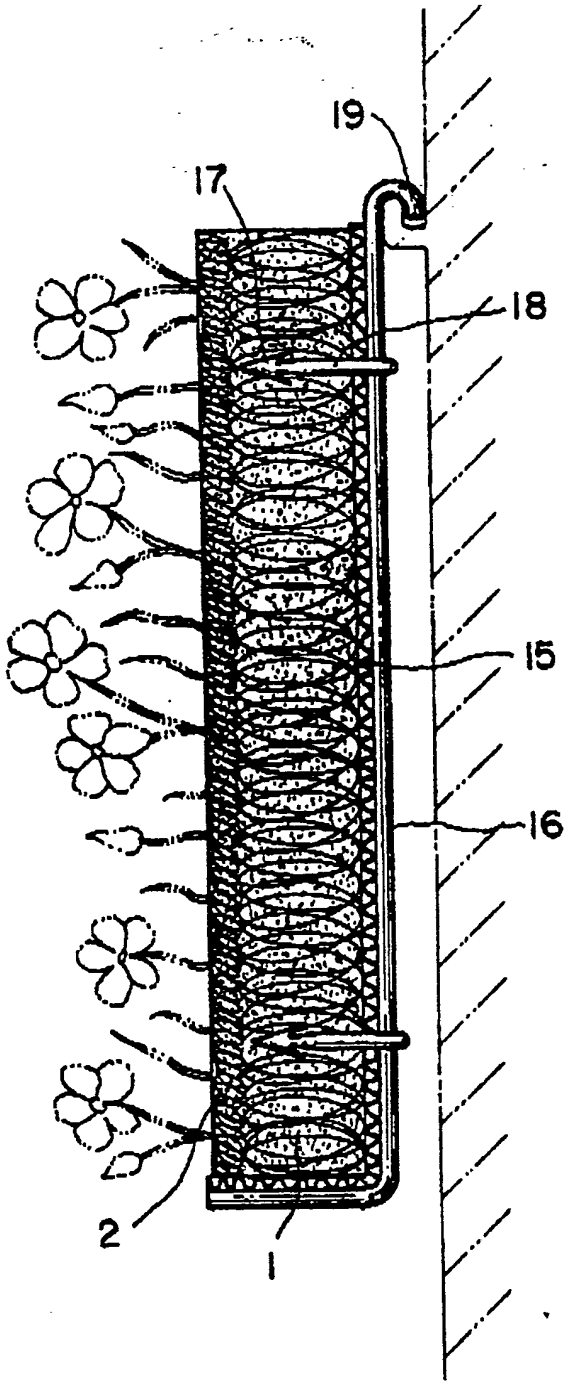


FIG. 6

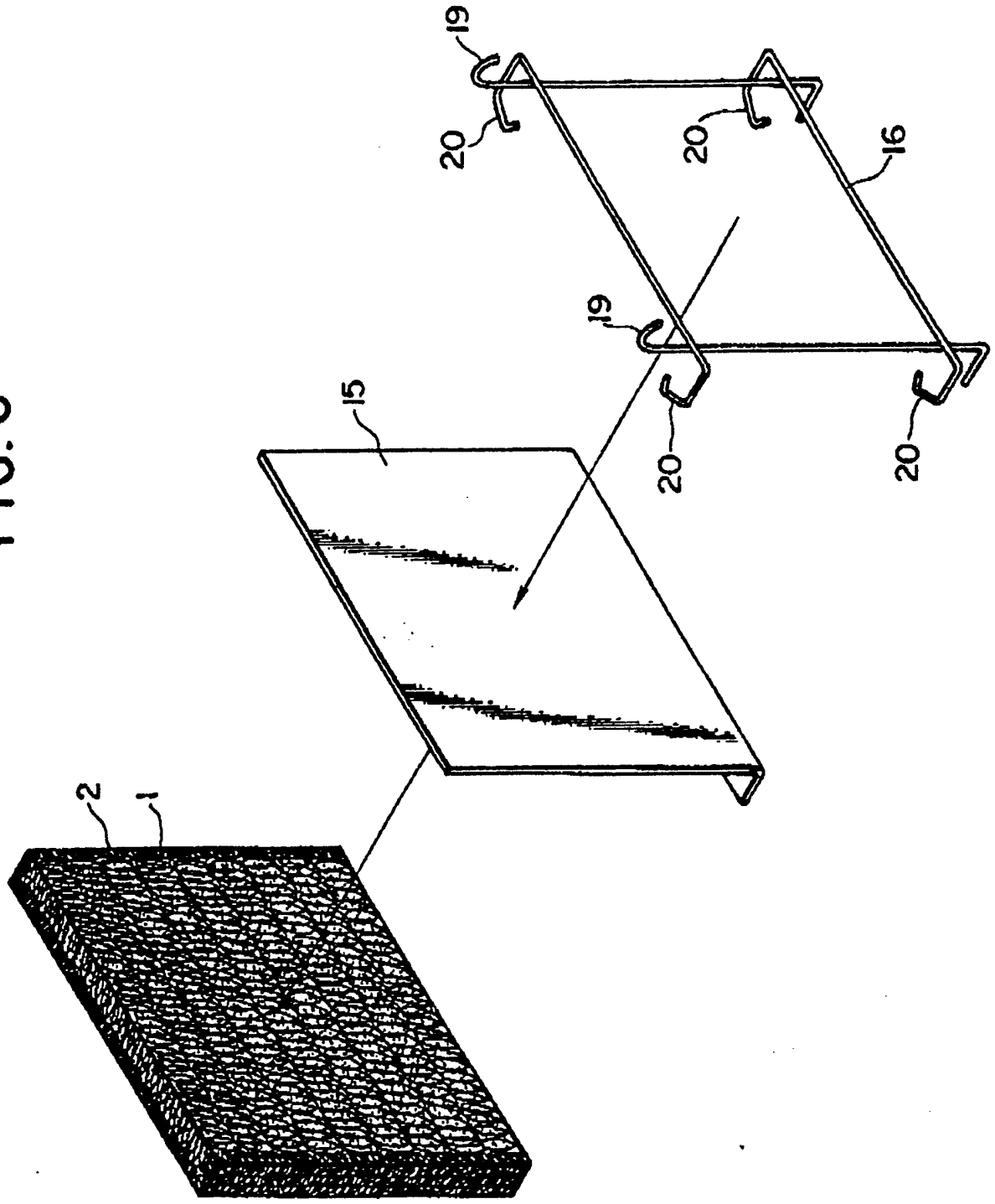


FIG. 7

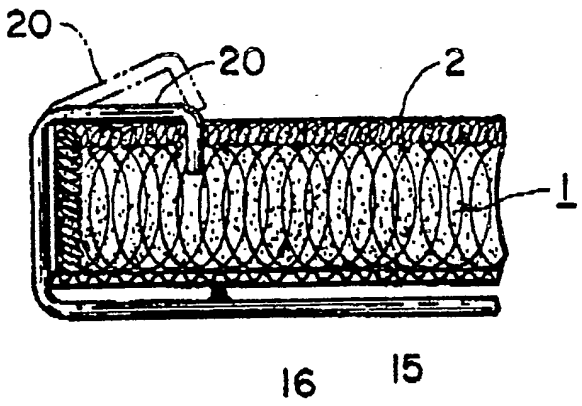
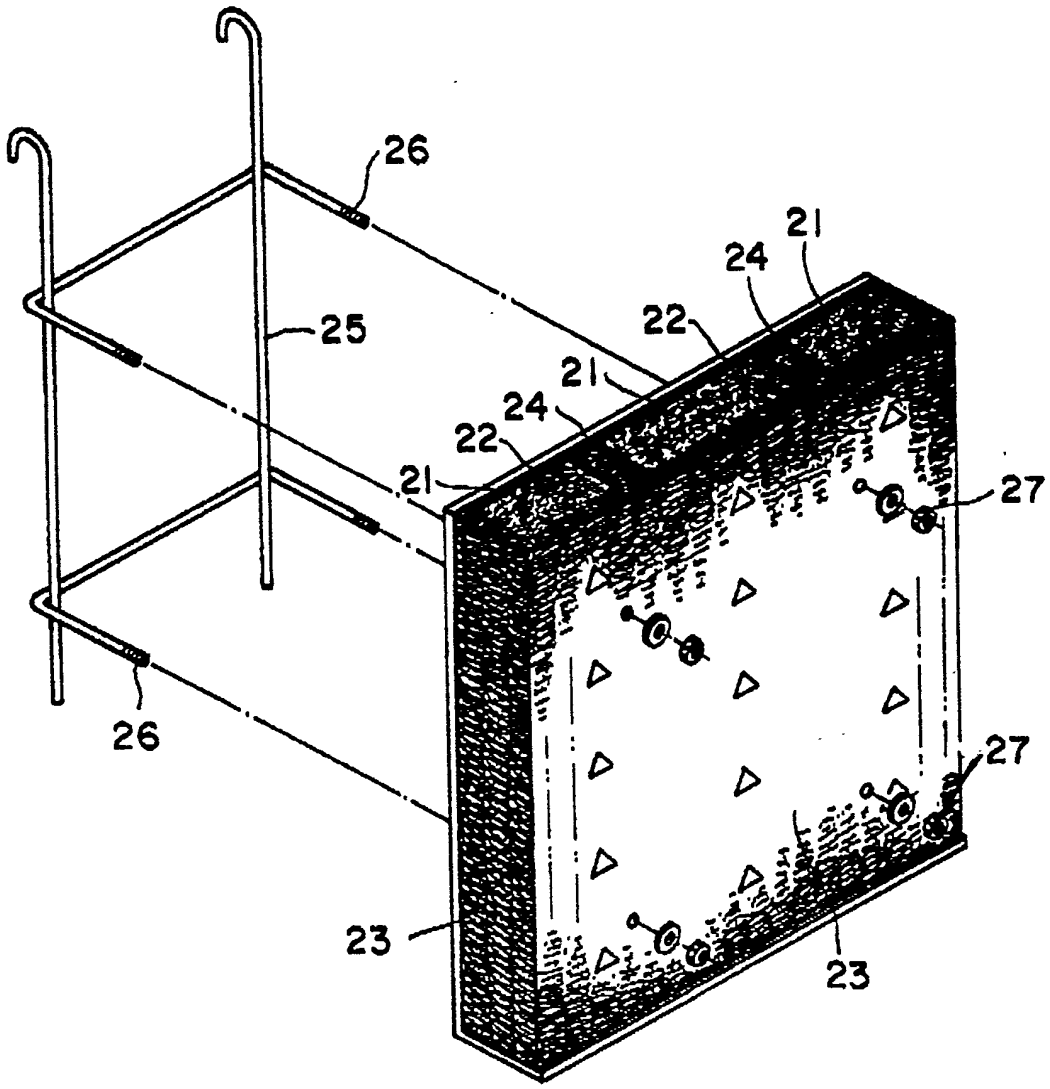


FIG. 8



APPARATUS FOR CULTURING PLANTS

The invention relates to apparatus for culturing horticultural plants such as flowering plants.

Hitherto, when horticultural plants were cultured so as to be displayed, it was necessary to employ natural soils, artificial culture soils or culture solutions for hydroponics which were received in a suitable container such as a flower pot.

However, a container such as a flower pot considerably restricts freedom of culturing mode of the horticultural plants, and also restricts freedom of displaying mode of the same, because if the container is used in a tilted condition the culture soil partially falls to the floor. In addition, the container is hung against a wall, it is necessary to employ a container-supporting means such as a rope basket or a rattan basket for hanging the container against the wall. If the container is disposed on a sloping display surface to realize a three-dimensional display, it is necessary to employ a stepped shelf unit provided with a horizontal shelf portion through which the container is disposed horizontally on the sloping display surface. Consequently, a container such as the flower pot considerably restricts freedoms of culturing and displaying modes of the horticultural plants.

According to the invention, there is provided apparatus for culturing plants, comprising:

a three-dimensional generally planar network element constructed of synthetic resin filaments with the synthetic resin filaments extending in curves and zigzags and being entangled and partially welded to each other, the three-dimensional generally planar network element having at least one cavity portion therein filled or to be filled with culture soil.

Advantageously the at least one cavity portion comprises a plurality of rows of chambers formed in the three-dimensional network element with the chambers defined by walls having elongate irrigation cavities therein.

Preferably the apparatus includes a lining plate for lining a back surface of the network element, which lining plate serves as a reinforcing plate and a plate for preventing the culture soil of the apparatus from falling out.

Advantageously the lining plate is fixed to the three-dimensional network element by means of a wire frame. The wire frame is preferably provided with a hook means for hanging the apparatus on a wall as a unit.

It is also possible detachably to mount the wire frame on the three-dimensional network. In this case, the wire frame may be provided with projections which penetrate the three-dimensional network element so that threaded free end portions project rearwardly from the front surface of the three-dimensional network element, which threaded free end portions of the projections threadably engage with nuts, whereby the wire frame is fixedly mounted on the three-dimensional network element.

The synthetic resin filaments may be made of a suitable thermoplastics resin such as: polypropylene; polyester; nylon; polystyrene or polyethylene.

Since the filaments can extend through-out the apparatus to form a three-dimensional network of filaments, it is possible for the plants firmly to root. Particularly, after plants have grown and rooted, the culture soil is firmly held by the filaments and the roots of the plants. Consequently, the apparatus of the invention does not require a conventional container such as a flower pot and is therefore free from the restrictions caused by the conventional container to make it possible to realize various culturing and displaying modes of the plants.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:-

Figure 1 is a perspective view of a first embodiment of apparatus according to the invention for culturing plants;

Figure 2 is a perspective view of the apparatus of Figure 1, mounted in a picture frame;

Figure 3 is a perspective view of a second embodiment of apparatus according to the invention for culturing plants;

Figure 4 is an exploded view of the apparatus of Figure 3;

Figure 5 is a cross-sectional view taken on line V-V of Figure 3;

Figure 6 is a view similar to Figure 4 of a modification of the second embodiment of the invention shown in Figure 4;

Figure 7 is a partial cross-sectional view similar to Figure 5 of a modification of the second embodiment of the invention shown in Figure 6; and

Figure 8 is an exploded view of a third embodiment of apparatus according to the invention for culturing plants.

Referring to the drawings and firstly to Figures 1 and 2, a first embodiment of apparatus for culturing plants comprises synthetic resin filaments 2 which extend in zigzags so as to curve, as to be entangled and as to be partially welded to each other to form a three-dimensional generally flat network element 1. The network element 1 has cavities filled with culture soil 4 and constitutes a plant cultivator 13 for culturing plants. The plant cultivator 13 is provided of a rectangular shape as shown in Figure 1 and flowering plant seeds can be sown in the culture soil 4 of a front surface of the plant cultivator 13 to grow therein. When the plants begin to put forth their blossoms, the plant cultivator 13 can be set in a picture frame 28 as a unit and hung against a wall so that the plant cultivator 13 is displayed as an amusing picture, as shown in Figure 2.

In the first embodiment of the plant cultivator 13, the filaments 2 are more compacted in a peripheral portion of the cultivator 13 than in a middle portion of the cultivator 13 and the peripheral portion of the cultivator 13 is filled with culture soil 4 having a predetermined grain size larger than that of the culture soil 4 filled in the middle portion of the cultivator 13.

The filaments 2 of the plant cultivator 13 are preferably made of black polypropylene. In general, it is preferable to colour the filaments 2 black or other dark colour to shut light out of the roots of the plants in order to facilitate rooting of the plants.

The culture soil 4 employed in the plant cultivator 13 may be a conventional horticultural soil, for example such as one prepared by mixing natural culture soils with vermiculite, perlite, high-water-adsorptive resin particles and fertilizers (chemical manure) at a conventional rate, the natural culture soils for example comprising Akadama soil or Kanuma soil.

The filaments 2 of the plant cultivator 13 may be prepared by extruding molten polypropylene downward from a plurality of suitably-arranged nozzles having a predetermined nozzle size, and by

withdrawing the thus extruded molten polypropylene filaments at a withdrawing speed lower than the extruder speed of the molten polypropylene so that the extruded molten polypropylene filaments are forced to curve so as to be partially welded to each other before they are cured. After completion of curing of the thus extruded molten polypropylene filaments, the filaments 2 appear.

In the plant cultivator 13, the culture soil 4 may be filled in the three-dimensional network element 1 of the cultivator 13 after the network element 1 is constructed of the filaments 2, or may be gradually filled in the three-dimensional network element 1 as the network element is constructed of the filaments 2.

Cut surfaces of the three-dimensional network element 1 may be sealed by applying an emulsion resin adhesive and like agents to the cut surfaces.

Figures 3 to 5 illustrate a second embodiment of a plant cultivator 13 which has a thick rectangular shape as shown in Figure 3. The filaments 2 are more compacted in opposite side portions and a front surface portion of the three-dimensional network element 1 than in remaining portions of the network element 1. There is substantially no difference in fundamental construction between the three-dimensional network element 1 of the first embodiment shown in Figure 1 and that of the second embodiment shown in Figure 3.

As shown in Figure 4, a lining plate 15 is constructed of a plastics corrugated board and is employed to prevent the culture soil 4 filled in the network element 1 from falling on the floor. The lining plate 15 is applied to a back surface of the three-dimensional network element 1, while fixed thereto by means of a wire frame 16 assuming a rectangular shape. Thus, the three-dimensional network element 1 is lined with the lining plate 15 and the wire frame 16 is provided with a plurality of bent-needle portions 18 each of which is provided with a barb 17, the bent-needle portions 18 extending in a direction perpendicular to a plane in which the wire frame 16 lies. On assembly, as shown in Figure 5, the wire frame 16 is applied to the back surface of the three-dimensional network element 1 through the lining plate 15 to cause the bent-needle portions 18 of the wire frame 16 to enter the network element 1 so that assembly of the second embodiment of the plant cultivator 13 is accomplished. As can be seen

in Figure 5, the rectangular wire frame 16 is provided with hook portions 19 in its upper portion, which hook portions 19 enable the wire frame 16 to be hung on a wall vertically or obliquely.

Figures 6 and 7 illustrate a modification of the second embodiment of the plant cultivator 13, in which the bent-needle portions 18 of the second embodiment are replaced by U-shaped portions 20 as shown in Figure 6. On assembly of the modification of the second embodiment of the plant cultivator 13, the U-shaped portions 20 of the rectangular wire frame 16 are caused to clamp the sides of both the three-dimensional network element 1 and the lining plate 15 together to assemble them into the plant cultivator 13.

Figure 8 illustrates a third embodiment of plant cultivator 13, in which three elongate open chambers 21 are formed in parallel with each other in the three-dimensional network element 1, into which chambers 21 the culture soil 4 is filled. In the third embodiment shown in Figure 8, the three-dimensional network element 1 substantially constitutes a box-like housing in which each of the chambers 21 has its opposite sides or an upper and a lower end open. However, it is also possible for each of the chambers 21 to have its opposite sides closed.

In the three-dimensional network element 1 of the third embodiment, the chambers 21 are defined by walls 22 of which: each of inner walls 22 is thicker than each of peripheral walls 22. As shown in Figure 8, each of the inner walls 22 is provided with an elongate irrigation cavity 24 extending in a longitudinal direction of each of the inner walls 22, which cavity 24 serves for irrigation of the plants when the plant cultivator 13 of the third embodiment is hung vertically or obliquely in use.

In the third embodiment of the plant cultivator 13, the bent-needle portions 18 of the first embodiment are replaced with threaded portions 26. On assembly of the third embodiment the wire frame 16 is applied to a one surface of the three-dimensional network element 1 to cause the threaded portions 26 to penetrate the network element 1, so that the free end of each of the threaded portions 26 of the wire frame 16 extends from the opposite surface of the network element 1; and the thus extended free end of each of the threaded portions 26 of the wire frame 16 is threadably engaged with a nut 27 so

as fixedly to mount the wire frame 16 on the network element 1. The third embodiment of the plant cultivator 13 is thus assembled from the components 1, 16 and 27. Since the plant cultivator 13 of the third embodiment shown in Figure 8 has the above construction, the wire frame 16 of the plant cultivator 13 can be used many times over. In addition, in the third embodiment, the three-dimensional network element 1 can be used also many times over, provided that the culture soil 4 filled in the chambers 21 of the network element 1 is periodically replaced with fresh culture soil.

In use, the plant cultivator 13 is disposed in a horizontal orientation and plant seeds are sown in a front surface of the cultivator 13. After the plants sufficiently root, the plant cultivator 13 can be moved to a veranda, a balcony or other display room where the plant cultivator 13 can be hung against a vertical wall or an oblique wall to realize a three-dimensional flower presentation and a mini botanical garden for amusement.

CLAIMS

1. Apparatus for culturing plants, comprising:
a three-dimensional generally planar network element constructed of synthetic resin filaments with the synthetic resin filaments extending in curves and zigzags and being entangled and partially welded to each other, the three-dimensional generally planar network element having at least one cavity portion therein filled or to be filled with culture soil.

2. Apparatus for culturing plants according to claim 1, wherein the at least one cavity portion comprises a plurality of rows of chambers formed in the three-dimensional network element, and the chambers are defined by walls having elongate irrigation cavities therein.

3. Apparatus for culturing plants according to claim 1, including a lining plate for lining a back surface of the network element, which lining plate serves as a reinforcing plate and a plate for preventing the culture soil of the apparatus from falling out.

4. Apparatus for culturing plants according to claim 3, wherein the lining plate is fixed to the three-dimensional network element by means of a wire frame.

5. Apparatus for culturing plants according to claim 4, wherein the wire frame is provided with hook means for hanging the apparatus on a wall as a unit.

6. Apparatus for culturing plants according to claim 4, wherein the wire frame is detachably mounted on the three-dimensional network element.

7. Apparatus for culturing plants according to claim 4, wherein the wire frame is provided with projections which penetrate the three-dimensional network element so that threaded free end portions project rearwardly from the front surface of the three-dimensional network element, which threaded free end portions of the projections

threadably engage with nuts, whereby the wire frame is fixedly mounted on the three-dimensional network element.

8. Apparatus for culturing plants substantially as hereinbefore described and illustrated with reference to the accompanying drawings.

Published 1990 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office. Sales Branch, St Mary Cray, Orpington, Kent BR5 3RD. Printed by Multiplex techniques ltd, St Mary Cray, Kent, Con. 1/87

PUB-NO: GB002224191A

DOCUMENT-IDENTIFIER: GB 2224191 A

TITLE: Apparatus for culturing plants

PUBN-DATE: May 2, 1990

INVENTOR-INFORMATION:

NAME	COUNTRY
MORIMURA, TADAKI	N/A

ASSIGNEE-INFORMATION:

NAME	COUNTRY
MORIMURA KOSAN KK	JP

APPL-NO: GB08921940

APPL-DATE: September 28, 1989

PRIORITY-DATA: JP21534889A (August 22, 1989) , JP24478588A (September 29, 1988)

INT-CL (IPC): A01G009/00

EUR-CL (EPC): A01G009/02

US-CL-CURRENT: 47/9 , 47/65.9 , 47/FOR.100

ABSTRACT:

CHG DATE=19940730 STATUS=O> Apparatus for

culturing plants, comprises a three-dimensional generally planar network element (1) constructed of synthetic resin filaments (2) which extend in curves and zigzags and are entangled and partially welded to each other, the three-dimensional flat network element (1) having at least one cavity portion therein filled with culture soil (4). The flat network element (1) can be hung on a wall in a substantially vertical orientation. □